<table>
<tr><th colspan="3">CS-37: Machine Learning with Python</th></tr>
<tr><td colspan="3">Objectives:
To Understand and develop model of ML with Python.
Apply ML techniques to real-world data sets and problems.
Learn how to deploy machine learning models into production environments.
Prerequisites:
Basic Understanding of Python Programming.</td></tr>
<tr><th>Unit No.</th><th>Topic</th><th>Detail</th></tr>
<tr><td>1</td><td>Introduction to Machine Learning</td><td>Introduction to ML, Relation of ML with AI and DL, Defining Machine Learning, How machines learn, types of machine learning: supervised learning, unsupervised learning, reinforcement learning, applications of machine learning.</td></tr>
<tr><td>2</td><td>Supervised Learning</td><td>Regression: Pre-processing data using different techniques – mean removal, scaling, normalization, binarization, label encoding, linear regression, case study implementation using Python
Classification: Building simple classifier, logistic regression classifier, Naïve bayes classifier, training and testing dataset, accuracy using cross-validation, visualizing confusion matrix, extracting the performance report.
Predictive Modeling: Building linear and non-linear classifier using Support Vector Machine (SVM), extracting confidence measurements, Case study implementation using Python.</td></tr>
<tr><td>3</td><td>Unsupervised Learning</td><td>Clustering: Data using k-means clustering, compressing image using vector quantization, mean shift clustering model, agglomerative clustering, case study implementation using Python.</td></tr>
<tr><td>4</td><td>Natural Language Processing</td><td>Natural Language Processing:
pre-processing data,
stemming data,
using lemmatization,
diving chunks,
text classifier,
case study implementation using Python.</td></tr>
<tr><td>5</td><td>Computer Vision with OpenCV</td><td>Object Detection:
Detecting and tracking objects using Haar cascades from images and videos
Detecting face, eyes, mouth, nose, pupils</td></tr>
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Reference Books:

▪ "Machine Learning" by Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das - Pearson

- "Python Machine Learning Cookbook" by Prateek Joshi – PACKT Publishing – 2016 Edition.
- "OpenCV: Computer Vision Projects with Python – Learning Path" by Joseph howse, Prateek Joshi, Michael Beyeler – PACKT Publishing – 2016 Edition.

Course Outcomes:

- To define and explain machine learning and its relation with AI and DL along with types of ML.
- To determine regression or classification supervised learning method of ML to any real-life application and estimate accuracy of the model.
- To be able to contrast various unsupervised learning methods and solve any real0life situation using ML and estimate accuracy of the model.
- To solve any fundamental text-processing.
- To construct a model to detect object from it.